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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,242	01/14/2005	Miki Ogawa	03500.017473.	7202

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EXAMINER	
EMPIE, NATHAN H	
ART UNIT	PAPER NUMBER
1712	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,242	OGAWA, MIKI	
	Examiner	Art Unit	
	NATHAN H. EMPIE	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,5,17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Examiner acknowledges receipt of 2/19/10 amendment to the claims which was entered into the file. Claims 1, 3, 5, and 17 are currently pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3, 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stucky (WO 99/37705; hereafter Stucky) in view of Crepaldi et al. ("Design and Post-Functionalisation of Ordered Mesoporous Zirconia Thin Films" Chemical Communications, 2001, pg 1582-1583; hereafter Crepaldi) and Miyata et al. ("Alignment of Mesoporous Silica on a Glass Substrate by a Rubbing Method" Chem. Mater. V11 (1999) 1609 – 1614; as provided in applicant's IDS dated 9/29/05; hereafter Miyata).

Claim 1, 3, 5, and 17: Stucky teaches a method for manufacturing a mesoscopically ordered, mesoporous structured films and monoliths (of metal oxides such as SiO_2, SnO_2, ZrO_2, etc) (abstract, pg 18 lines 20 – pg 19 line 30, pg 36 line 24 – pg 37 line7) comprising the steps of:

preparing a reactant solution that contains a metal precursor material for forming mesostructured films which contain a metal oxide (see, for example, TEOS (pg 36 line24 – pg 37 line7), or metal chlorides (such as, $SnCl_4$, listed in pg 65,Table 3)),

amphiphilic materials such as a non-ionic surfactant (see, for example, $C_{16}H_{33}(OCH_2CH_2)_{10}OH$ ($C_{16}EO_{10}$) (cetyl hydrophobic group) and numerous other non-ionic alkyl polyethylene oxide (polyoxyethylene-ether) surfactants (pg 38 lines 21 –30, pgs 63-64, Table 2) or amphiphilic poly(alkylene oxide) block copolymers (see, for example, PEO-PPO-PEO pg 18 lines 20 – pg 19 line 30)) and a solvent (such as ethanol) (See, for example, pg 42 lines 10 – 21);

applying the reaction solution onto a substrate by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line7), (pg 42 lines 8 – 23)).

Stucky teaches an aging time to allow the solution to gel, and drying of gel (see, for example, (pg 42 lines 8 – 23)). Stucky further teaches that in the processes of forming these mesoporous films and monoliths, synthetic conditions such as the humidity can be modified to impact the resulting structure of the film (pg 46 lines 5 – 13), thereby recognizing humidity as a result effective variable. Also Stucky mentions that modifications including additional heat treatments following gelation can produce harder materials that are less likely to crack, but Stucky is silent as to the specifics of such treatments (pg 39 lines 1 – 7), so Stucky does not explicitly teach retaining the substrate onto which the reaction solution has been applied in an atmosphere having a relative humidity of from 10% to 30 % to dry the solvent in the reaction solution; then forming the mesostructured film at a temperature of 100^{o}C or less in a vapor-containing atmosphere at a relative humidity in a range of from 70% to 100% to orient the plurality of assemblies of the surfactant in a predetermined direction, thereby improving regularity of a mesostructure of the mesostructured film. Crepaldi teaches a method of

forming mesoporous zirconia thin films (See, for example, abstract). Crepaldi further teaches the importance of a post functionalisation process, as well as importance that a multi-treatment / exposure to varying relative humidity environments post deposition play (See, for example, pg 1582 – 1583). Crepaldi has taught a solvent drying processes at 60°C, as well as demonstrating that temperature is a result effective variable (See, for example, pg 1582-1583). Crepaldi specifically teaches that the best optical quality and organization was obtained via a two -step initial drying - aging process wherein a sol-gel film, is initially dried at 10% relative humidity, is then exposed to a high humidity atmosphere (>80% RH) wherein the incorporation of water aids organization (see, for example, pg 1583). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a preliminary solvent drying step at 10% RH followed by exposure to water vapor containing high humidity environment of >80% RH as taught by Crepaldi, into the process of forming a sol-gel derived coating, as taught Stucky, as Stucky describes humidity as result effective variables for his process, as well as introducing additional heat treatments, but is silent as to specific conditions of each, and Crepaldi teaches the conditions of a two-step low, then high humidity treatment step that results in improved optical quality.

Stucky in view of Crepaldi do not explicitly teach the temperature of the claimed "forming" step, the examiner asserts that conventionally when certain conditions such as temperature are not explicitly taught in the prior art, it is common to practice STP (standard temperature and pressure) (so about room temperature, ~25°C), further the

prior art have further identified temperature as a result effective variable, so it would have obvious to one of ordinary skill in the art to have incorporated the claimed forming process at a temperature within the range of 100°C or less since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Stucky in view of Crepaldi teaches all the features of these claims except for the limitations directed to the substrate having a capability of / and orienting a plurality of assemblies of the amphiphilic material in a predetermined direction. Stucky further teaches that the reaction solution can be applied onto a substrate (such as glass) by a process such as spin-, drop-, or dip-casting (see, for example, (pg 36 line 24 – pg 37 line7), (pg 42 lines 8 – 23)). Miyata teaches a method of preparing a film of mesoporous material (silica, from a TEOS / surfactant reactant solution) on a coated glass substrate (see, for example, pg 1609-1610, Abstract, and “Experimental Section”). The glass substrate is provided with a polyimide film that is treated with rubbing which gives alignment control to the substrate, which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, for example, pg 1610, first col, and “Experimental Section”). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated using a glass substrate provided with a precoating of a rubbed polymer film, as taught by Miyata, as the glass substrate taught in the method of Stucky in view

of Crepaldi as it would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Such an incorporation would result in a method which would possess a substrate having a capability of orienting aggregate of the amphiphilic material, and one wherein the assemblies of the amphiphilic material would be oriented in the predetermined (rubbing) direction.

Claim 17 further: Stucky further teaches removing the surfactant (amphiphilic material) to form a pore (see, for example, calcination step, pg 42 lines 19 - 23).

Claims 1, 3, 5, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata et al ("Preparation of Highly Ordered Mesostructured Tin Oxide Film with a Microcrystalline Framework through Vapor-Induced Liquid Crystal Templating" in Chem. Mater. 2003, 15, 1334-1343; hereafter Miyata2) in view of Miyata.

Claims 1, 3, 5: Miyata2 teaches a method of producing a mesostructured film (see, for example, abstract) comprising the steps in sequence;

preparing a reaction solution comprising a tin-containing compound ($SnCl_4$) for forming a mesostructured film which contains a tin oxide, a surfactant (such as poly(oxyethylene)alkyl ethers, $C_{18}EO_{10}$, etc), and a solvent (such as ethanol) (see, for example, abstract, and pg 1336, experimental section),

applying the reaction solution onto a substrate (see, for example, a glass plate, pg 1336, experimental section),

retaining the substrate onto which the reaction solution has been applied in an atmosphere having a relative humidity of 20%RH to dry the solvent in the reaction solution (See, for example, pg 1336),

after the solvent is dried, retaining the substrate in a water vapor-containing atmosphere having a relative humidity of 80% RH and a temperature of 40°C to orient the plurality of assemblies of the surfactant, thereby improving the regularity of a mesostructure of the mesostructured film (See, for example, pg 1336).

Miyata2 teaches all the features of these claims except for the limitations directed to the substrate having a capability of / and orienting a plurality of assemblies of the surfactant in a predetermined direction. Miyata2 further teaches that the reaction solution can be applied onto a substrate (such as glass) by a process such as dip-coating (see, for example, pg 1336). Miyata teaches a method of preparing a film of mesoporous material (silica, from a TEOS / surfactant reactant solution) on a coated glass substrate (see, for example, pg 1609-1610, Abstract, and "Experimental Section"). The glass substrate is provided with a polyimide film that is treated with rubbing which gives alignment control to the substrate, which is taught as desirable in that it provides an ordered mesoporous films with aligned channels (see, for example, pg 1610, first col, and "Experimental Section"). The result of the film formation process is an aligned structured with oriented channels aligned with respect to the substrate. It would have been obvious to one of ordinary skill in the art at the time of invention to have incorporated using a glass substrate provided with a precoating of a rubbed polymer film, as taught by Miyata, as the glass substrate taught in the method of Miyata2 as it

would provide a desirable ordered alignment of the for the mesostructured / mesoporous coating. Such an incorporation would result in a method which would possess a substrate having a capability of orienting a plurality of assemblies of the surfactant, and one wherein the assemblies of the surfactant would be oriented in the predetermined (rubbing) direction.

Claim 17: Miyata2 further teaches removing the surfactant to form a pore (See, for example, pg 1335, 1338)

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Response to Arguments

Applicant's recent amendments of claims 1 and 17, filed 2/19/10, with respect to the rejection(s) of claim(s) 1, 3, 5, and 17 under Stucky in view of Nogues and Miyata have been fully considered and are persuasive, none of the references has sufficiently taught the at least two step solvent removal then ordering step with specifically claimed relative humidity environments as recently amended. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Stucky in view of Crepaldi and Miyata (as described above), and Miyata2 in view of Miyata (as described above).

The examiner's previously applied nonstatutory obviousness-type double patenting rejection of claims 1, 3, 5, and 17 over claims 1-4 of copending application no.

11/267156 in view of Miyata has been withdrawn since copending application no. 11/267156 has been abandoned as of 4/12/10.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN H. EMPIE whose telephone number is (571)270-1886. The examiner can normally be reached on M-F, 7:00- 4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. H. E./
Examiner, Art Unit 1712

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1712